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NOTIFICATION OF POLIOMYELITIS.

Because of the unusual prevalence of poliomyelitis in the United States during the last few years the subject is one of general interest to health authorities. A commission appointed by the Academy of Medicine of Paris to report upon the advisability of making obligatory in France the notification of this disease made its report on July 11, 1911. A translation of the report follows:

OBLIGATORY NOTIFICATION OF POLIOMYELITIS (INFANTILE PARALYSIS).¹

Report presented to the Paris Academy of Medicine by Arnold Netter in the name of a commission composed of MM. Roux, Chantemesse, Chauffard, Roger, and Netter.²

Translated by W. C. Rucker, Passed Assistant Surgeon, Public Health and Marine-Hospital Service.

The Academy of Medicine appointed a commission on the 30th of May last to discuss the expediency of classifying poliomyelitis, or infantile paralysis, among the diseases in which notification is obligatory.

Article 4 of the law of February 15, 1902, states that "The list of diseases is prepared by a decree of the President of the Republic, promulgated upon the report of the Minister of the Interior by advice of the Academy of Medicine and the consulting committee on public hygiene of France, and may be revised in the same manner."

In accordance with the above, the decree of February 10, 1903, has established a list of 13 diseases in which notification is obligatory and 9 diseases in which notification is optional.

Since 1903 the academy has expressed its sentiments on several occasions regarding the expediency of adding other diseases to the first list.

It has gone on record regarding the obligation of notification in recurrent fever³ and the affections due to trypanosomes and piroplasms⁴ in Algeria and the colonies. It has advised that mention be made of paratyphoid infections along with reports of typhoid fever.⁵ Finally, following a communication by M. Widai, it urged the notification of Malta fever⁶ in France.

Your commission has charged me with presenting to you a final report upon the notification of poliomyelitis in France.

*The sanitary legislation of other countries has ere this prescribed notification.*⁷ On August 25, 1905, the King of Sweden decreed that in so far as they concern the disease called acute infantile paralysis the laws in force relative to the diseases contemplated by section 20, article 1, of the royal ordinances upon the measures against the introduction and propagation of contagious⁸ diseases into the Kingdom, dated March 19, 1875, shall be applied.

The same year notification was imposed in Norway.

¹ From the Bulletin of the International Office of Public Hygiene, Paris, Tome III, 1389-1399, August, 1911.

² Meeting of the Academy of Medicine, July 11, 1911.

³ Bulletin of the Academy, meeting Dec. 17 and 24, 1907.

⁴ Bulletin of the Academy, meeting Jan. 3, 1911.

⁵ Bulletin of the Academy, meeting Nov. 22, 1910.

⁶ Bulletin of the Academy, meeting Nov. 15, 1910.

⁷ Throughout the translation italics have been used as in the original report.

⁸ The diseases in which the law requires notification in Sweden are plague, cholera, smallpox, typhus, typhoid fever, scarlatina, diphtheria, dysentery, and leprosy. Notification is imposed upon the attending physician, the head of the family, and the members of the clergy.

A number of States in the United States have successively enacted similar measures requiring notification of suspected cases, quarantine of patients and their contacts, disinfection of the discharges during the course of the disease, and disinfection of the surroundings after the termination of the disease—Massachusetts, New York, Pennsylvania, Minnesota, Virginia, Iowa, Nebraska, Kansas, the District of Columbia.¹ Similar measures have been prescribed in various cities in Ohio, Connecticut, New Jersey, etc.

In the course of the months of September and October, 1909, notification was made obligatory in many Austrian Provinces, Upper Austria, Styria, Carinthia, Carniola, Salzburg, Lower Austria, and the Tyrol, etc.

The same year, 1909, the German authorities judged necessary the same measures in the Provinces of Westphalia, and the bulletins of the sanitary office show that notification is made in all Germany.

The measures which are proposed for the French Government are, as we have seen, imposed by foreign nations, but to justify the notification of poliomyelitis we will invoke more direct arguments.

We will show in fact that a contagium unquestionably exists in the dissemination of poliomyelitis; that experimental pathology as well as epidemiology has specified the usual mode of transmission and indicated the means to oppose the progress of the disease. We shall furnish proof of the efficacy of the measures taken after notification.

I.

The set of questions put to physicians by the minister of the interior has not been followed by sufficient responses to give a precise figure to the subject of *the importance of poliomyelitis in France*, in the last two years. Your reporter has been able to affirm that since the summer of 1909² its frequency in Paris and its environs has been much greater than previously, and it has been easy to gather an unusual number of cases. It has been possible to establish that various parts of France have also been stricken and one can certainly fix at several hundred the number of cases of this disease in 1910 as in 1909. The number is evidently smaller than in the United States³ (more than 6,000 in 1910) or in the Rhine Provinces and Westphalia in 1909 (more than 2,000) or the Austrian Provinces in 1908 and 1909 (more than 1,500). It is none the less alarming if one takes account of the consequences of the disease which often induce grave and persistent deformities and which is followed by death in more than a tenth of the cases.

Poliomyelitis is not only infectious, but is also contagious. Difficult of demonstration in the large cities and in countries having a dense population, transmission by contact is, on the contrary, evident in localities having a sparse population among which communication is rare and easy of control. Your reporter has been able to follow the mutual connections in many of the cases in the departments and in the suburbs of Paris.

¹ Poliomyelitis has been made reportable in California, District of Columbia, Idaho, Maine, Massachusetts, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Utah, Washington, and Wisconsin.—Editor.

² Arnold Netter, Medical Society of the Hospitals of Paris, Nov. 12, 1909.

³ Arnold Netter, Bulletin of the Academy of Medicine of May 31, 1910–May 23, 1911.

The contagion manifests itself first of all *by the coexistence of a succession of cases in a family or in a house*. We have personally observed this succession in 16 families. In Sweden in 1905, in not less than 28 families out of 100, the disease attacked more than one person. In upper Austria this proportion reached 38 per hundred and in the State of Nebraska, in 1909, the number was 40 per hundred. In the latter State the proportion of families where all the children without exception have been attacked is also high.

We have been able to gather in France, as have other authors in Sweden, Norway, the United States, Austria, Germany, etc., a number of observations proving that *persons have been attacked by poliomyelitis several days after a short and single contact with a patient*, and it is thus that the disease has been transported great distances (from Saint-Florentin to Paris; from the neighborhood of Salies de Bearn to Bordeaux; from Paris to the Department of Morbihan, etc.).

The contagion is not only taken from patients or convalescents. *The intervention of healthy persons, carriers of germs*, is often manifest, and we have noted many unquestionable examples.

Wickmann has shown how *the schools are able to serve for the dissemination of the disease*. Children who attend the school and carry the contagion to their fellows may remain themselves free from the disease. Your reporter has noted analogous facts, and they are not missing in the German, Austrian, and American reports.

In other localities and by a similar mechanism, *markets, fairs, and public gatherings* contribute to the dissemination of the disease.

We will cite further convincing facts of the *transmission by objects* which have been in contact with patients.

Experimental pathology permits us to analyze with greater precision the modes of transmission of poliomyelitis.

Landsteiner and Popper were the first to show, in the year 1908, the possibility of reproducing in the monkey by inoculating its nervous centers, a disease presenting the evolution, symptomatology, and lesions of human poliomyelitis. Since then the discoveries have multiplied and the laboratories of France, Austria, Germany, and the United States have vied with one another in making valuable contributions to the subject.

Although we have not succeeded as yet in seeing and cultivating the pathogenic agent of poliomyelitis, we know that it belongs in the category of ultra-microscopic organisms or *filtrable viruses*, a class which includes a great many species pathogenic for man (rabies, yellow fever) or for animals (rabies, pleuro-pneumonia, foot-and-mouth disease, and distemper.)

The passage of the virus of poliomyelitis through porcelain bougies permits its separation from germs of larger size, and it is thus that Flexner and Lewis have been able to furnish experimental proof of the *presence of the virus in the nasal mucous membrane of the monkey*, and that Landsteiner and Levaditi found it in the *saliva of the monkey* and on the *surface of the tonsils in man*.

The virus is able in these locations to preserve its activity for a long time after the onset of the disease. Osgood and Lucas have demonstrated the virulence of the nasal mucous membrane of a paralyzed monkey inoculated five and one-half months previously. More recently, also, Osgood has succeeded in producing a poliomyelitis

by inoculating the adenoid growths removed from a child which was paralyzed more than six months previously.

Regarding the *entrance of the virus to the body*, it is accomplished by various routes, by the nasal fossæ (Leiner and Wiener, Flexner and Lewis), the trachea and bronchi, and the digestive route. It may travel along the nerves, etc.

More resistant than the microbes of cerebro-spinal meningitis, the virus of poliomyelitis resists desiccation 15 and sometimes 28 days.¹ It may thus be carried by dust, preserving its activity upon its particles.² Flexner and Clark³ have been able to demonstrate the transference by flies. Flies placed on the surface of the medulla of an infected animal still carried the virulent principles after 48 hours.

It is thus shown that the contagiousness of poliomyelitis is incontestable. One might object that this contagiousness is relatively slight, that it is infinitely less than that of the eruptive fevers for example. We do not contradict this. There are a number of examples in which in spite of the absence of all precautions the first case of poliomyelitis was followed by no others, and that in a family including several children living in a single room and using the same bed. Although in certain epidemics there have been 40 per cent of families having more than one case, in New York the number was 3 per cent.

This contagiousness, often small, should not make us forget the cases where contact is evident, and the latter demand that we take prophylactic measures. Are these not properly imposed in cerebro-spinal meningitis, which, like poliomyelitis, often remains without secondary cases and presents only rarely a manifestly contagious character?

II.

In order to justify the classification of poliomyelitis among the reportable diseases, it is not sufficient to demonstrate that the disease is infectious and contagious; it is necessary also that the notification to the public authorities should be followed by efficient prophylactic measures.

The most important of these measures are isolation and disinfection. Both find their application in infantile paralysis.

We have seen that the contagion is not distributed solely by patients and convalescents. We must also take account of healthy subjects, carriers of germs, whose rôle has been established above.

Notification of cases of poliomyelitis will permit the interdiction of school attendance, not only by convalescents, but also by their brothers and sisters and the playmates of the patients.

Because of the danger from carriers one might go even further, should it be necessary, and impose a quarantine on the friends and associates of patients.

¹ This is done by suspending the medulla in a flask at the bottom of which is placed caustic potash. Exposed in a chopped layer, that is to say under conditions which approach more nearly the transmission under natural conditions, the virus resists desiccation much less. Leiner and Wiener could not discover any virulence after 28 hours exposure.

² Neustaedter and Thro, N. Y. Med. Jour., 1911, XCIV, 613-615, have recently reported successful inoculation of monkeys with dust from rooms occupied by patients having poliomyelitis.—W. C. R.

³ Flexner and Clark. Contamination of the fly with poliomyelitis virus. J. A. M. A. June 10, 1911.

⁴ Experimental poliomyelitis has been reproduced almost exclusively upon monkeys. The coincidence of epizootics among various domestic species has been noted many times, but the facts reported have not been precise.

Here is an example of the efficacy of isolation. There is no place where poliomyelitis has made as great ravages as in the State of Nebraska in 1909. A collective inquiry has permitted MacClanahan, of Omaha, to gather 999 cases out of a population of 421,000, or 2.45 per thousand. The number in certain counties has been 0.8 per hundred, 1.46 per hundred, and 3.2 per hundred. The epidemic began in the village of Stromsburg, and, as is frequent in such cases, the diagnosis at first wavered between poliomyelitis and cerebrospinal meningitis. There being no sanitary regulations regarding the matter, no measures were instituted. The Fourth of July celebration disseminated the disease in the neighboring localities and to considerable distances in the State. Therefore, the sanitary authorities, who were called together immediately, decided, July 21, on the placing in absolute quarantine for three months of all the members of the patient's family, exception being made of the head of the family, the breadwinner of the household. The result was unexpected; 12 days later there were no new cases.

The number of cases reported prior to July 4 was 30; from July 4 to the end of the month, 115; from then to the 3d of August, 15 only.

The same measures brought quite as convincing results in other parts of the State, where the quarantine often included all the members of the family without exception.

The notification of any of the diseases contemplated by article 4 of the law of 1902 entails on the part of the authorities disinfection of the patient's surroundings and articles which he has touched. Heat usually applied by means of the steam chamber, or formaldehyde vapors, are chiefly used in these operations and act efficiently against the virus of poliomyelitis which is promptly destroyed by heat between 50° and 55° and does not resist the action of formaldehyde (Roemer and Joseph). It is known that the efficacy of the measures of disinfection has been denied in the prophylaxis of cerebrospinal meningitis, the microbes of which resist desiccation very slightly. Similar objection should not be made to disinfection in poliomyelitis where the medulla remains virulent after 24 days of desiccation and from which Flexner and Clark have demonstrated the possibility of transference of the virus by flies. A certain number of epidemiological facts similarly establish the possible transmission of the disease by inanimate objects. For example, Wickmann has cited the case of a woman who fell ill in Stockholm the 25th of September after having copied a drawing made by a convalescent from poliomyelitis at the beginning of September. The illness of the latter began July 27 in a place more than 100 kilometers away. Eichelberg, at Goettingen, noted the unusual frequency of poliomyelitis in shoemakers' families and found that in two of these the children were stricken 9 or 10 days after the father had mended the shoes of children having acute infantile paralysis. In the Austrian reports, many instances are cited of families having a sick child after having moved into an apartment in which the previous occupants had had a case of poliomyelitis.

These latter observations seem to prove the persistence of the virus in dust and would coincide with an observation of Hill. In the city of Winona (Mich.)¹ out of 29 cases reported in July, 27 were

¹ The author evidently means Minnesota.—W. C. R.

situated on the same dusty street. The city began the careful sprinkling of the streets, after which time no more cases occurred.

The attending physician will be able, by the use of hygienic precautions, to prevent the spread of the disease.

Since he knows the contagiousness of the disease, he should instruct the nurse as to the usual precautions to be observed and he should forbid the entrance of other persons into the sick room.

The presence of the pathogenic agent in the nasal fossæ and its probable entrance by that route, permits the hope that antiseptics of the nasal fossæ of patients and their intimates and other persons exposed to the contagion would more or less diminish the risks of contagion. Experiments have shown that the virus of poliomyelitis is slightly resistant to the various disinfectant agents. Menthol, powdered salol, permanganate of potash 2 to 1,000, or 1 per cent hydrogen peroxide may be employed in such cases. The physician should advise the use of such agents in gargles, washes, or powders in the nasal fossæ.

Under the head of prophylaxis he may also order the administration of urotropin. This drug, which becomes transformed into formaldehyde, an agent the activity of which against the virus is demonstrated, appears very quickly after ingestion in the cephalorachidian fluid, and Flexner and Clark believe that its use probably hinders the development of experimental poliomyelitis.

III.

We have thus demonstrated successively the contagiousness of poliomyelitis and the possibility of efficaciously opposing its progress. The conclusion which follows is that *poliomyelitis should be classed among the reportable diseases.*

It is useless to object that *the disease does not always exhibit a contagious character*, that many of the cases, the great number, for that matter, are not followed by secondary cases. It is enough that contagion is possible, that it is manifest in a certain number of cases. Admitting the difficulty of investigating a disease which is chiefly transmitted by a healthy third person, the conclusion should not be reached that a case occurring apparently without contact has not been received from another case and can not become itself the origin of later cases.

The difficulty of early diagnosis, the impossibility of recognizing certain cases simulating the symptomatology of meningitis or other affection may be urged against notification. The proven persistence of the contagion in convalescents shows that notification, even though late, would have its usefulness from the point of view of the measures to be taken with regard to the convalescent and his intimates. The knowledge of reported cases arouses the physician and creates in his mind an early suspicion of poliomyelitis masked by deceptive symptoms.

One might be tempted to demand the notification of epidemic poliomyelitis and to neglect that for sporadic or common infantile paralysis, which has always existed in many forms and to which we have not dreamed of attributing a contagious character. There is no distinction between the two diseases. Epidemic poliomyelitis is exactly the same disease as sporadic infantile paralysis. The pathological

anatomy, the clinical findings, the seasonal prevalence, the existence of small family outbreaks creates this belief.¹

Doubt is no longer possible, since your reporter demonstrated with M. Levaditi that cases of the old type of infantile paralysis present in their blood the same immunizing properties as convalescents from epidemic poliomyelitis.² If at certain times poliomyelitis takes on an epidemic character it is because, under the influence of various unknown factors, the virus takes on an activity and the power of great diffusion. In suppressing or in rendering harmless the isolated cases one should reduce the chances of diffusion. This was well recognized by the Scandinavian sanitary authorities where the notification of poliomyelitis is at all times obligatory, though in all Sweden in 1910 there were only reported 4 cases and 2 deaths, and from the 1st of January to the 30th of April, 1911, there were 14 cases with 2 deaths.

Your commission propose that you vote on the following conclusions:

The academy advises the adoption of notification in acute anterior poliomyelitis (infantile paralysis, Heine-Medin disease, etc.).

This notification would apply not only to the typical cases, but also to the doubtful ones.

It would be made at all times, no matter whether the disease was epidemic or not.

It would allow the interdiction of school attendance for three months, and would apply equally to patients and convalescents.

Articles liable to become contaminated by the secretions and excretions of patients should be disinfected during the course of the disease and convalescence. The disinfection of the premises at the close of the illness is equally advisable.

(The conclusions of the report were put to a vote and adopted.)

¹ Arnold Netter, Medical Society of the Paris Hospitals, Dec. 10, 1909.

² Netter and Levaditi: *Comptes rendus de la Soc. de Biologie*, Apr. 9 and May 21, 1910.